CLAIMS

1. A method of assay comprising subjecting a sample to a quantitative or qualitative determination of the presence in the sample of (a) an auto-reactive immune system component specifically recognising an epitope containing an isomerised peptide linkage and/or an optically inverted amino acid, and/or (b) an auto-antigen or a fragment thereof containing a said epitope and/or (c) a non-self antigen or fragment thereof which contains a said epitope and is capable of inducing an autoimmune response.

2. A method as claimed in Claim 1, wherein said immune system component is a cellular immune system component.

3. A method as claimed in Claim 2, wherein said immune system component is a T-lymphocyte.

4. A method as claimed in Claim 1, wherein said immune system component is a humoral immune system component.

5. A method as claimed in Claim 4, wherein said epitope comprises an amino acid sequence derived from IgG containing an isomerised peptide linkage or optically inverted amino acid.

6. A method as claimed in Claim 4, wherein said immune system component is an auto-antibody directed against an epitope comprising the amino acid *Asx contained in any one of the sequences:

Trp-Leu-*Asx-Gly-Lys-Glu-Tyr
Trp-Glu-Ser-*Asx-Gly
His-Phe-Phe-Lys-*Asx-Ile-Val-Thr-Pro
Pro-Ser-*Asx-Glu-Gly-Lys-Gly-Arg
Ala-Leu-Gly-Ile-Gly-Thr-*Asx-Ser-Val-Ile
Trp-Ser-Phe-Gly-Ser-Glu-*Asx-Gly-Ser-Gly-*Asx-Ser-Glu-Asn
Ala-Gly-Trp-Leu-*Asx-Gly-Ser-Val-Arg
Gly-Arg-Val-Arg-Val-*Asx-Ser-Ala-Tyr.

where Asx* is αD Asp or Asn, or is ßL or ßD, Asp formed by isomerisation/optical inversion of Asp or Asn residues in the original sequence.

7. A method as claimed in Claim 4, wherein said immune system component is an auto-antibody directed against an epitope comprising the amino acid *Asx contained either of the sequences:
Met-Glu-Val-Gly-Trp-Tyr-Arg-Pro-Pro-Phe-Ser-Arg-Val-Val-His-Leu-Tyr-Arg-*Asx-Gly-Lys- or
Val-Val-His-Phe-Phe-Lys-*Asx-Ile-Val-Thr-Pro
where *Asx is αD Asp or Asn, or is ßD, or ßL Asp formed by isomerisation/optical inversion of Asp or Asn residues in the original sequence.

8. A method as claimed in Claim 4, wherein said immune system component is an auto-antibody directed against an epitope comprising the amino acid *Glx contained in any one of the sequences:
Pro-Ser-*Glx-Gly-Lys-Gly-Arg
Phe-Ser-Trp-Gly-Ala-*Glx-Gly-Arg or

Asp-Ala-*Glx-Gly-Thr-Leu-Ser-Lys

where *Glx is αD Glu or Gln, or is γL or γD Glu formed by isomerisation/optical inversion of Glu or Gln residues in the original sequence.

9. A method as claimed in any one Claims 1 to 8, wherein detection of said immune system component or auto-antigen is indicative of an auto-immune disease.

10. A method as claimed in Claim 9, wherein said disease is rheumatoid arthritis, multiple sclerosis, insulin dependent diabetes mellitus, myasthenia gravis, celiac disease, Chagas' disease, psoriasis, or Crohn's disease.

11. A method for the detection of an auto-antigen or fragment thereof comprising detecting the reactivity of said auto-antigen or fragment with an immunological binding partner specific for the presence in said auto-antigen of an isomerised peptide linkage or an optically inverted amino acid.

12. A method as claimed in Claim 11, wherein said immunological binding partner is specific for an epitope as defined in any one of Claims 6 to 8.

13. A method as claimed in any preceding claim, providing information as to the amount of said immune system component or auto-antigen or non-self antigen or antigen fragment detected.

14. A method for locating an epitope or epitopes in an auto-antigen comprising using L-iso-aspartyl (D-aspartyl) methyl-transferase (IAMT) and a source of labelled methyl groups to introduce said labelled methyl groups at one or more isomerised peptide linkage and/or optically inverted amino acids in said auto-antigen, and determining at least one location in said auto-antigen at which said labelled methyl groups are thus introduced, establishing the amino acid sequence of said auto-antigen in a region encompassing a said location and testing a peptide of said amino acid sequence incorporating at said location said isomerised or optically inverted amino acid for immuno-reactivity with an auto-reactive immune system component.

15. A method as claimed in Claim 14, wherein the auto-antibodies are associated with an autoimmune disease.

16. A method as claimed in Claim 14, wherein the autoimmune disease is rheumatoid arthritis, multiple sclerosis, insulin dependent diabetes mellitus, myasthenia gravis, celiac disease, Chagas' disease, psoriasis, or Crohn's disease.

17. A peptide containing an epitope recognised by an auto-reactive immune system component, which epitope contains an isomerised peptide linkage and/or an optically inverted amino acid.

18. A peptide as claimed in Claim 17, containing an epitope as defined in any one of Claims 6 to 8.

19. A peptide as claimed in Claim 18, comprising the altered amino acid residue *Asx, or *Glx and at least 3 flanking amino acid residues in the N-terminal and/or C-terminal direction, where *Glx is αD Glu or Gln, or is γL or γD Glu formed by isomerisation/optical inversion of Glu or Gln residues in the original sequence and where *Asx is αD Asp or Asn, or is βL or βD Asp formed by isomerisation/optical inversion of Asn or Asp residues in the original sequence.